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CATTOLI, Giovanni

<120> HELICOBACTER FELIS VACCINES

<130> KUSTERS

<140> 09/904,994

<141> 2001-07-13

<150> EP00202565.8

<151> 2000-07-17

<160> 21

<170> PatentIn Ver. 2.1

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<212> DNA

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Val Lys Leu Thr Pro Lys Glu Gln Glu

1

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Lys Phe Leu Leu Tyr Tyr Ala Gly Glu Val Ala Arg Lys Arg Lys Ala
10 15 20 25

gag ggc tta aag ctc aac caa ccc gaa gcc att gct tac att agt gcc 328

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Arg Tyr Thr Phe Phe
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Arg Gly Lys Lys Thr Val Ala Gln Leu Met Glu Glu Cys Met His Phe
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65 70 75 80
Leu Gly Val Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr Val
85 90 95
Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys
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Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Ala Gly Lys Glu Val Thr
115 120 125
Glu Leu Glu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser
130 135 140
His Phe His Phe Phe Glu Ala Asn Lys Ala Leu Lys Phe Asp Arg Glu
145 150 155 160
Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg
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Ile Gly Ala Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly Gly
180 185 190
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Tyr Lys Ala Asp Ile Gly Ile Lys Asn Gly Lys Ile His Gly Ile Gly
85 90 95
Lys Ala Gly Asn Lys Asp Met Gln Asp Gly Val Ser Pro His Met Val
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Val Gly Val Gly Thr Glu Ala Leu Ala Gly Glu Gly Met Ile Ile Thr
115 120 125
Ala Gly Gly Ile Asp Ser His Thr His Phe Leu Ser Pro Gln Gln Phe
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Pro Thr Ala Leu Ala Asn Gly Val Thr Thr Met Phe Gly Gly Thr
145 150 155 160
Gly Pro Val Asp Gly Thr Asn Ala Thr Thr Ile Thr Pro Gly Lys Trp
165 170 175
Asn Leu His Arg Met Leu Arg Ala Ala Glu Glu Tyr Ser Met Asn Val
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Gly Phe Leu Gly Lys Gly Asn Ser Ser Ser Lys Lys Gln Leu Val Glu
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Gln Val Glu Ala Gly Ala Ile Gly Phe Lys Leu His Glu Asp Trp Gly
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Thr Thr Pro Ser Ala Ile Asp His Cys Leu Ser Val Ala Asp Glu Tyr
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Asp Val Gln Val Cys Ile His Thr Asp Thr Val Asn Glu Ala Gly Tyr
245 250 255
Val Asp Asp Thr Leu Asn Ala Met Asn Gly Arg Ala Ile His Ala Tyr
260 265 270
His Ile Glu Gly Ala Gly Gly His Ser Pro Asp Val Ile Thr Met
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Ala Gly Glu Leu Asn Ile Leu Pro Ser Ser Thr Thr Pro Thr Ile Pro
290 295 300

Tyr Thr Ile Asn Thr Val Ala Glu His Leu Asp Met Leu Met Thr Cys
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 His His Leu Asp Lys Arg Ile Arg Glu Asp Leu Gln Phe Ser Gln Ser
 325 330 335
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 Gly Glu Val Ile Pro Arg Thr Trp Gln Thr Ala Asp Lys Asn Lys Lys
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 385 390 395 400
 Ile Lys Arg Tyr Ile Ser Lys Tyr Thr Ile Asn Pro Ala Leu Thr His
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 435 440 445
 Ile Lys Gly Gly Met Val Val Phe Ser Glu Met Gly Asp Ser Asn Ala
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 Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr Arg Glu Met Phe Gly His
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 His Gly Lys Ala Lys Phe Asp Thr Ser Ile Thr Phe Val Ser Lys Val
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Pro Glu Ala Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala Arg
35 40 45

cgt ggc aaa aaa acc gtt gct gaa ctt atg gaa gaa tgt atg cac ttt 192
Arg Gly Lys Lys Thr Val Ala Glu Leu Met Glu Glu Cys Met His Phe
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Leu Gly Val Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr Val
85 90 95

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Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys
100 105 110

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Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Ala Gly Lys Glu Val Thr
115 120 125

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Glu Leu Glu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser
130 135 140

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His Phe His Phe Glu Thr Asn Lys Ala Leu Lys Phe Asp Arg Glu
145 150 155 160

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Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg
165 170 175

att ggg gca gga caa acc cgt aaa gtg cag tta atc cct ctt ggc ggt 576

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Ile	Lys															Met Lys Met Lys Lys Gln Glu Tyr Val Asn
225																230
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Ser	Pro	Asp	Glu	Asn	Thr	Leu	Asp	Leu	Val	Ile	Thr	Asn	Ala	Met	Ile	
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320																325
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430	435	440	445
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Ser Val Ala Asp Glu Tyr Asp Val Gln Val Cys Ile His Thr Asp Thr			
465	470	475	
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480	485	490	
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495	500	505	
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575	580	585	
caa gca atg ggg cgc gct ggg gaa gtg att cct aga act tgg caa act			1825
Gln Ala Met Gly Arg Ala Gly Glu Val Ile Pro Arg Thr Trp Gln Thr			
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705	710	715	
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Thr Phe Val Ser Lys Val Ala Tyr Glu Asn Gly Val Lys Glu Lys Leu			
720	725	730	
ggc tta gag cgc aag gtg cta ccc gtg zaa aac tgc cgc aac atc act			2257
Gly Leu Glu Arg Lys Val Leu Pro Val Lys Asn Cys Arg Asn Ile Thr			
735	740	745	
aag aaa gac ttc aaa ttc aac aac aag acg gcg cat atc act gtc gat			2305

Lys	Lys	Asp	Phe	Lys	Phe	Asn	Asn	Lys	Thr	Ala	His	Ile	Thr	Val	Asp	
750				755						760				765		
cct aaa acc ttc gag gtc ttt gta gat ggc aaa ctc tgc acc tct aaa															2353	
Pro	Lys	Thr	Phe	Glu	Val	Phe	Val	Asp	Gly	Lys	Leu	Cys	Thr	Ser	Lys	
					770			775			780					
ccc gcc tct gaa gtg cct cta gcc caa cgc tac act ttc ttc tag															2398	
Pro	Ala	Ser	Glu	Val	Pro	Leu	Ala	Gln	Arg	Tyr	Thr	Phe	Phe			
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gcacaaat															2405	
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1		5							10				15			
Gly																
	Glu	Val	Ala	Arg	Lys	Arg	Lys	Ala	Glu	Gly	Leu	Lys	Leu	Asn	Gln	
		20							25				30			
Pro	Glu	Ala	Ile	Ala	Tyr	Ile	Ser	Ala	His	Ile	Met	Asp	Glu	Ala	Arg	
		35							40				45			
Arg	Gly	Lys	Lys	Thr	Val	Ala	Glu	Leu	Met	Glu	Glu	Cys	Met	His	Phe	
		50							55			60				
Leu	Lys	Lys	Asp	Glu	Val	Met	Pro	Gly	Val	Gly	Asn	Met	Val	Pro	Asp	
		65							70			75			80	
Leu	Gly	Val	Glu	Ala	Thr	Phe	Pro	Asp	Gly	Thr	Lys	Leu	Val	Thr	Val	
									85			90			95	
Asn	Trp	Pro	Ile	Glu	Pro	Asp	Glu	His	Phe	Lys	Ala	Gly	Glu	Val	Lys	
									100			105			110	
Phe	Gly	Cys	Asp	Lys	Asp	Ile	Glu	Leu	Asn	Ala	Gly	Lys	Glu	Val	Thr	
									115			120			125	
Glu	Leu	Glu	Val	Thr	Asn	Glu	Gly	Pro	Lys	Ser	Leu	His	Val	Gly	Ser	
									130			135			140	
His	Phe	His	Phe	Phe	Glu	Thr	Asn	Lys	Ala	Leu	Lys	Phe	Asp	Arg	Glu	
									145			150			155	
Lys	Ala	Tyr	Gly	Lys	Arg	Leu	Asp	Ile	Pro	Ser	Gly	Asn	Thr	Leu	Arg	
									165			170			175	
Ile	Gly	Ala	Gly	Gln	Thr	Arg	Lys	Val	Gln	Leu	Ile	Pro	Leu	Gly	Gly	
									180			185			190	
Ser	Lys	Lys	Val	Ile	Gly	Met	Asn	Gly	Leu	Val	Asn	Asn	Ile	Ala	Asp	
									195			200			205	
Glu	Arg	His	Lys	His	Lys	Ala	Leu	Asp	Lys	Ala	Lys	Ser	His	Gly	Phe	
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Ile Lys

225

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His Asp Tyr Thr Thr Tyr Gly Glu Glu Leu Lys Phe Gly Ala Gly Lys
35 40 45

Thr Ile Arg Glu Gly Met Gly Gln Ser Asn Ser Pro Asp Glu Asn Thr
50 55 60

Leu Asp Leu Val Ile Thr Asn Ala Met Ile Ile Asp Tyr Thr Gly Ile
65 70 75 80

Tyr Lys Ala Asp Ile Gly Ile Lys Asn Gly Lys Ile His Gly Ile Gly
85 90 95

Lys Ala Gly Asn Lys Asp Met Gln Asp Gly Val Ser Pro His Met Val
100 105 110

Val Gly Val Gly Thr Glu Ala Leu Ala Gly Glu Gly Met Ile Ile Thr
115 120 125

Ala Gly Gly Ile Asp Ser His Thr His Phe Leu Ser Pro Gln Gln Phe
130 135 140

Pro Thr Ala Leu Ala Asn Gly Val Thr Thr Met Phe Gly Gly Thr
145 150 155 160

Gly Pro Val Asp Gly Thr Asn Ala Thr Thr Ile Thr Pro Gly Lys Trp
165 170 175

Asn Leu His Arg Met Leu Arg Ala Ala Glu Glu Tyr Ser Met Asn Val
180 185 190

Gly Phe Leu Gly Lys Gly Asn Ser Ser Ser Lys Lys Gln Leu Val Glu
195 200 205

Gln Val Glu Ala Gly Ala Ile Gly Phe Lys Leu His Glu Asp Trp Gly
210 215 220

Thr Thr Pro Ser Ala Ile Asp His Cys Leu Ser Val Ala Asp Glu Tyr
225 230 235 240

Asp Val Gln Val Cys Ile His Thr Asp Thr Val Asn Glu Ala Gly Tyr
245 250 255

Val Asp Asp Thr Leu Asn Ala Met Asn Gly Arg Ala Ile His Ala Tyr
260 265 270

His Ile Glu Gly Ala Gly Gly His Ser Pro Asp Val Ile Thr Met
275 280 285

Ala Gly Glu Leu Asn Ile Leu Pro Ser Ser Thr Thr Pro Thr Ile Pro
290 295 300

Tyr Thr Ile Asn Thr Val Ala Glu His Leu Asp Met Leu Met Thr Cys
 305 310 315 320
 His His Leu Asp Lys Arg Ile Arg Glu Asp Leu Gln Phe Ser Gln Ser
 325 330 335
 Arg Ile Arg Pro Gly Ser Ile Ala Ala Glu Asp Val Leu His Asp Ile
 340 345 350
 Gly Val Ile Ala Met Thr Ser Ser Asp Ser Gln Ala Met Gly Arg Ala
 355 360 365
 Gly Glu Val Ile Pro Arg Thr Trp Gln Thr Ala Asp Lys Asn Lys Lys
 370 375 380
 Glu Phe Gly Lys Leu Pro Glu Asp Gly Ala Asp Asn Asp Asn Phe Arg
 385 390 395 400
 Ile Lys Arg Tyr Ile Ser Lys Tyr Thr Ile Asn Pro Ala Leu Thr His
 405 410 415
 Gly Val Ser Glu Tyr Ile Gly Ser Val Glu Glu Gly Lys Ile Ala Asp
 420 425 430
 Leu Val Val Trp Asn Pro Ala Phe Phe Gly Val Lys Pro Lys Ile Val
 435 440 445
 Ile Lys Gly Gly Met Val Val Phe Ser Glu Met Gly Asp Ser Asn Ala
 450 455 460
 Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr Arg Glu Met Phe Gly His
 465 470 475 480
 His Gly Lys Ala Lys Phe Asp Thr Ser Ile Thr Phe Val Ser Lys Val
 485 490 495
 Ala Tyr Glu Asn Gly Val Lys Glu Lys Leu Gly Leu Glu Arg Lys Val
 500 505 510
 Leu Pro Val Lys Asn Cys Arg Asn Ile Thr Lys Lys Asp Phe Lys Phe
 515 520 525
 Asn Asn Lys Thr Ala His Ile Thr Val Asp Pro Lys Thr Phe Glu Val
 530 535 540
 Phe Val Asp Gly Lys Leu Cys Thr Ser Lys Pro Ala Ser Glu Val Pro
 545 550 555 560
 Leu Ala Gln Arg Tyr Thr Phe Phe
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Ala Gly Glu Val Ala Arg Lys Arg Lys Ala Glu Gly Leu Lys Leu Asn
20 25 30

caa ccc gaa gcc att gcc tac att agt gcc cat att atg gac gag gct 143
Gln Pro Glu Ala Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala
35 40 45

cgc cgt ggc aaa aaa acc gtt gct gaa ctt atg gaa gaa tgt atg cac 191
Arg Arg Gly Lys Lys Thr Val Ala Glu Leu Met Glu Glu Cys Met His
50 55 60

ttt ttg aaa aaa gat gag gtg atg ccc ggt gtg ggg aat atg gtc cct 239
Phe Leu Lys Lys Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro
65 70 75

gat ttg ggc gta gaa gcc act ttc ccc gat ggc acc aaa ctc gta acc 287
Asp Leu Gly Val Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr
80 85 90 95

gtg aat tgg ccc att gaa cct gat gaa cac ttt aaa gcc ggt gaa gtg 335
Val Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val
100 105 110

aaa ttt ggc tgt gat aaa gac att gag ctc aac gtg ggt aag gaa gtt 383
Lys Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Val Gly Lys Glu Val
115 120 125

acc gag ctt gaa gtt acc aac gaa gga cct aaa tcc ttg cat gtg ggt 431
Thr Glu Leu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly
130 135 140

agc cat ttc cac ttc ttt gaa acc aac aag gca ttg aaa ttc gat cgg 479
Ser His Phe His Phe Glu Thr Asn Lys Ala Leu Lys Phe Asp Arg
145 150 155

gaa aaa gcc tat ggc aaa cgc cta gat att ccc tct ggc aac acg cta 527
Glu Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu
160 165 170 175

cgc att ggg gca gga caa acc cgt aaa gtg cag tta atc cct ctt ggc 575

Arg Ile Gly Ala Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly			
180	185	190	
ggt agt aaa aaa gtg att ggc atg aac ggg ctt gtg aat aat att gcg			623
Gly Ser Lys Lys Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala			
195	200	205	
gac gaa cgc cat aaa cac aaa gca cta gac aag gca aaa tct cac gga			671
Asp Glu Arg His Lys His Lys Ala Leu Asp Lys Ala Lys Ser His Gly			
210	215	220	
ttc atc aag taa ggagactccc atg aaa atg aaa aca gag tat gta			720
Phe Ile Lys	Met Lys	Met Lys Lys Gln Glu Tyr Val	
225	230	235	
aac acc tac gga ccc acc aca ggc gat aaa gtg cgc tta gga gat acc			768
Asn Thr Tyr Gly Pro Thr Thr Gly Asp Lys Val Arg Leu Gly Asp Thr			
240	245	250	
gat ctt tgg gca gaa gta gaa cat gac tat acc act tat ggc gaa gag			816
Asp Leu Trp Ala Glu Val Glu His Asp Tyr Thr Thr Tyr Gly Glu Glu			
255	260	265	
ctc aaa ttt ggc gcg ggt aaa act atc cgt gag ggt atg ggt cag agc			864
Leu Lys Phe Gly Ala Gly Lys Thr Ile Arg Glu Gly Met Gly Gln Ser			
270	275	280	
aat agc cca gat gaa aac acc tta gat tta gtc atc acc aac gcg atg			912
Asn Ser Pro Asp Glu Asn Thr Leu Asp Leu Val Ile Thr Asn Ala Met			
285	290	295	300
att atc gac tac acc ggg att tat aaa gcc gac att ggt att aaa aat			960
Ile Ile Asp Tyr Thr Gly Ile Tyr Lys Ala Asp Ile Gly Ile Lys Asn			
305	310	315	
ggc aaa atc cat ggt att ggc aag gcg ggg aac aaa gac atg caa gat			1008
Gly Lys Ile His Gly Ile Gly Lys Ala Gly Asn Lys Asp Met Gln Asp			
320	325	330	
ggc gta agc cct cat atg gtc gtg ggt gtc ggc aca gaa gca cta gca			1056
Gly Val Ser Pro His Met Val Val Gly Val Gly Thr Glu Ala Leu Ala			
335	340	345	
ggg gaa ggt atg att att acc gct ggg ggg atc gat tcg cac acc cac			1104
Gly Glu Gly Met Ile Ile Thr Ala Gly Gly Ile Asp Ser His Thr His			
350	355	360	
ttc ctc tct ccc caa caa ttc cct acc gct cta gcc aat ggt gtt aca			1152

Phe	Leu	Ser	Pro	Gln	Gln	Phe	Pro	Thr	Ala	Leu	Ala	Asn	Gly	Val	Thr	
365				370					375			380				
acc atg ttt gga ggt ggc aca ggt ccg gta gat ggc acg aat gcg acc															1200	
Thr	Met	Phe	Gly	Gly	Gly	Thr	Gly	Pro	Val	Asp	Gly	Thr	Asn	Ala	Thr	
						385		390				395				
acc atc act ccg ggc aaa tgg aac ttg cac cgc atg ttg cgc gca gct															1248	
Thr	Ile	Thr	Pro	Gly	Lys	Trp	Asn	Leu	His	Arg	Met	Leu	Arg	Ala	Ala	
						400		405			410					
gaa gag tat tct atg aat gta ggc ttt ttg ggc aaa ggc aat agt tct															1296	
Glu	Glu	Tyr	Ser	Met	Asn	Val	Gly	Phe	Leu	Gly	Lys	Gly	Asn	Ser	Ser	
				415		420				425						
agc aaa aaa caa ctt gta gaa caa gta gaa gcg ggc gcg att ggc ttt															1344	
Ser	Lys	Lys	Gln	Leu	Val	Glu	Gln	Val	Glu	Ala	Gly	Ala	Ile	Gly	Phe	
				430		435			440							
aaa ttg cat gaa gac tgg ggc aca aca cca agt gcg atc gat cac tgc															1392	
Lys	Leu	His	Glu	Asp	Trp	Gly	Thr	Thr	Pro	Ser	Ala	Ile	Asp	His	Cys	
				445		450			455			460				
ttg agc gtg gca gat gaa tac gat gtg caa gtt tgt atc cac acc gat															1440	
Leu	Ser	Val	Ala	Asp	Glu	Tyr	Asp	Val	Gln	Val	Cys	Ile	His	Thr	Asp	
				465		470					475					
acg gtc aat gag gca ggt tat gtg gat gac acc cta aat gca atg aac															1488	
Thr	Val	Asn	Glu	Ala	Gly	Tyr	Val	Asp	Asp	Thr	Leu	Asn	Ala	Met	Asn	
				480		485				490						
ggg cgc gcc atc cat gcc tac cac att gag gga gcg ggc gga gga cac															1536	
Gly	Arg	Ala	Ile	His	Ala	Tyr	His	Ile	Glu	Gly	Ala	Gly	Gly	His		
				495		500			505							
tca cct gat gtt atc acc atg gca ggc gag ctc aat att cta ccc tcc															1584	
Ser	Pro	Asp	Val	Ile	Thr	Met	Ala	Gly	Glu	Leu	Asn	Ile	Leu	Pro	Ser	
				510		515			520							
tcc acc acc ccc act att ccc tat acc att aat acg gtt gca gaa cac															1632	
Ser	Thr	Thr	Pro	Thr	Ile	Pro	Tyr	Thr	Ile	Asn	Thr	Val	Ala	Glu	His	
				525		530			535			540				
tta gac atg ctc atg acc tgc cac cac cta gat aag cgc atc cgc gag															1680	
Leu	Asp	Met	Leu	Met	Thr	Cys	His	His	Leu	Asp	Lys	Arg	Ile	Arg	Glu	
				545		550			555							
gat tta caa ttt tct caa agc cgt atc cgc ccc gga tct att gcc gct															1728	

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Pro Glu Ala Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala Arg
35 40 45
Arg Gly Lys Lys Thr Val Ala Glu Leu Met Glu Glu Cys Met His Phe
50 55 60
Leu Lys Lys Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro Asp
65 70 75 80
Leu Gly Val Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr Val
85 90 95
Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys
100 105 110
Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Val Gly Lys Glu Val Thr
115 120 125
Glu Leu Glu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser
130 135 140
His Phe His Phe Phe Glu Thr Asn Lys Ala Leu Lys Phe Asp Arg Glu
145 150 155 160
Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg
165 170 175
Ile Gly Ala Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly Gly
180 185 190
Ser Lys Lys Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala Asp
195 200 205
Glu Arg His Lys His Lys Ala Leu Asp Lys Ala Lys Ser His Gly Phe
210 215 220
Ile Lys
225

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<211> 496

<212> PRT

<213> Helicobacter felis

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His Asp Tyr Thr Thr Tyr Gly Glu Glu Leu Lys Phe Gly Ala Gly Lys
35 40 45
Thr Ile Arg Glu Gly Met Gly Gln Ser Asn Ser Pro Asp Glu Asn Thr
50 55 60

Leu Asp Leu Val Ile Thr Asn Ala Met Ile Ile Asp Tyr Thr Gly Ile
 65 70 75 80
 Tyr Lys Ala Asp Ile Gly Ile Lys Asn Gly Lys Ile His Gly Ile Gly
 85 90 95
 Lys Ala Gly Asn Lys Asp Met Gln Asp Gly Val Ser Pro His Met Val
 100 105 110
 Val Gly Val Gly Thr Glu Ala Leu Ala Gly Glu Gly Met Ile Ile Thr
 115 120 125
 Ala Gly Gly Ile Asp Ser His Thr His Phe Leu Ser Pro Gln Gln Phe
 130 135 140
 Pro Thr Ala Leu Ala Asn Gly Val Thr Thr Met Phe Gly Gly Thr
 145 150 155 160
 Gly Pro Val Asp Gly Thr Asn Ala Thr Thr Ile Thr Pro Gly Lys Trp
 165 170 175
 Asn Leu His Arg Met Leu Arg Ala Ala Glu Glu Tyr Ser Met Asn Val
 180 185 190
 Gly Phe Leu Gly Lys Gly Asn Ser Ser Ser Lys Lys Gln Leu Val Glu
 195 200 205
 Gln Val Glu Ala Gly Ala Ile Gly Phe Lys Leu His Glu Asp Trp Gly
 210 215 220
 Thr Thr Pro Ser Ala Ile Asp His Cys Leu Ser Val Ala Asp Glu Tyr
 225 230 235 240
 Asp Val Gln Val Cys Ile His Thr Asp Thr Val Asn Glu Ala Gly Tyr
 245 250 255
 Val Asp Asp Thr Leu Asn Ala Met Asn Gly Arg Ala Ile His Ala Tyr
 260 265 270
 His Ile Glu Gly Ala Gly Gly His Ser Pro Asp Val Ile Thr Met
 275 280 285
 Ala Gly Glu Leu Asn Ile Leu Pro Ser Ser Thr Thr Pro Thr Ile Pro
 290 295 300
 Tyr Thr Ile Asn Thr Val Ala Glu His Leu Asp Met Leu Met Thr Cys
 305 310 315 320
 His His Leu Asp Lys Arg Ile Arg Glu Asp Leu Gln Phe Ser Gln Ser
 325 330 335
 Arg Ile Arg Pro Gly Ser Ile Ala Ala Glu Asp Val Leu His Asp Ile
 340 345 350
 Gly Val Ile Ala Met Thr Ser Ser Asp Ser Gln Ala Met Gly Arg Ala
 355 360 365
 Gly Glu Val Ile Pro Arg Thr Trp Gln Thr Ala Asp Lys Asn Lys Lys
 370 375 380
 Glu Phe Gly Lys Leu Pro Glu Asp Gly Ala Asp Asn Asp Asn Phe Arg
 385 390 395 400
 Ile Lys Arg Tyr Ile Ser Lys Tyr Thr Ile Asn Pro Ala Leu Thr His
 405 410 415
 Gly Val Ser Glu Tyr Ile Gly Ser Val Glu Glu Gly Lys Ile Ala Asp
 420 425 430
 Leu Val Val Trp Asn Pro Ala Phe Phe Gly Val Lys Pro Lys Ile Val
 435 440 445

Ile	Lys	Gly	Gly	Met	Val	Val	Phe	Ser	Glu	Met	Gly	Asp	Ser	Asn	Ala
450				455						460					
Ser	Val	Pro	Thr	Pro	Gln	Pro	Val	Tyr	Tyr	Arg	Glu	Met	Phe	Gly	His
465				470					475			480			
His	Gly	Lys	Ala	Lys	Phe	Asp	Thr	Ser	Ile	Thr	Phe	Arg	Val	Ser	Ser
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<212> DNA

<213> Helicobacter felis

<220>

<221> CDS

<222> (2)..(682)

<220>

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1		5							10					15			

ggc	gaa	gtg	gct	aga	aag	cgc	aaa	gct	gag	ggc	tta	aag	ctc	aac	caa	97
Gly	Glu	Val	Ala	Arg	Lys	Arg	Lys	Ala	Glu	Gly	Leu	Lys	Leu	Asn	Gln	
20		25										30				

ccc	gaa	gcc	att	gcc	tac	att	agt	gcc	cat	att	atg	gac	gag	gct	cgc	145
Pro	Glu	Ala	Ile	Ala	Tyr	Ile	Ser	Ala	His	Ile	Met	Asp	Glu	Ala	Arg	
35			40							45						

cgt	ggc	aaa	aag	acc	gtt	gct	gaa	ctt	atg	gaa	gag	tgt	atg	cac	ttt	193
Arg	Gly	Lys	Lys	Thr	Val	Ala	Glu	Leu	Met	Glu	Glu	Cys	Met	His	Phe	
50		55							60							

ttg	aaa	aaa	gac	gag	gtg	atg	ccc	ggt	gtg	ggg	aat	atg	gtc	cct	gat	241
Leu	Lys	Lys	Asp	Glu	Val	Met	Pro	Gly	Val	Gly	Asn	Met	Val	Pro	Asp	
65		70				75					80					

tta	ggc	gtg	gaa	gct	act	ttt	ccc	gat	ggc	acc	aaa	ctc	gta	acc	gtg	289
Leu	Gly	Val	Glu	Ala	Thr	Phe	Pro	Asp	Gly	Thr	Lys	Leu	Val	Thr	Val	
85			90							95						

aat	tgg	ccc	atc	gaa	ccc	gat	gaa	cac	ttc	aaa	gct	ggc	gaa	gtc	aaa	337
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Asn	Trp	Pro	Ile	Glu	Pro	Asp	Glu	His	Phe	Lys	Ala	Gly	Glu	Val	Lys	
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ttt ggc tgt gat aaa gac att gaa ctc aac gca ggt aag gaa gtt acc															385	
Phe	Gly	Cys	Asp	Lys	Asp	Ile	Glu	Leu	Asn	Ala	Gly	Lys	Glu	Val	Thr	
115															125	
gaa cta gaa gtt acc aac gaa gga cct aaa tcc ttg cat gtg ggt agc															433	
Glu	Leu	Glu	Val	Thr	Asn	Glu	Gly	Pro	Lys	Ser	Leu	His	Val	Gly	Ser	
130															140	
cat ttc cac ttc ttt gaa gcc aac aag gca ttg aaa ttc gat cgg gaa															481	
His	Phe	His	Phe	Glu	Ala	Asn	Lys	Ala	Leu	Lys	Phe	Asp	Arg	Glu		
145															160	
aaa gcc tat ggc aaa cgc cta gat att ccc tct ggc aac acg cta cgc															529	
Lys	Ala	Tyr	Gly	Lys	Arg	Leu	Asp	Ile	Pro	Ser	Gly	Asn	Thr	Leu	Arg	
165															175	
att ggg gca gga caa acc cgt aaa gtg cag tta atc cct ctt ggc ggc															577	
Ile	Gly	Ala	Gly	Gln	Thr	Arg	Lys	Val	Gln	Leu	Ile	Pro	Leu	Gly	Gly	
180															190	
agt aaa aaa gtg att ggc atg aac ggg ctt gtg aat aat att gca gat															625	
Ser	Lys	Val	Ile	Gly	Met	Asn	Gly	Leu	Val	Asn	Asn	Ile	Ala	Asp		
195															205	
gaa cgc cat aaa cac aaa gcg tta gaa aaa gca aaa tct cac gga ttt															673	
Glu	Arg	His	Lys	His	Lys	Ala	Leu	Glu	Lys	Ala	Lys	Ser	His	Gly	Phe	
210															220	
atc aaa taa ggagactccc atg aaa atg aaa aaa caa gag tat gta aat															722	
Ile	Lys															
225															235	
acc tac gga cct acc aca ggc gac aaa gtg cgc tta gga gat acc gat															770	
Thr	Tyr	Gly	Pro	Thr	Thr	Gly	Asp	Lys	Val	Arg	Leu	Gly	Asp	Thr	Asp	
240															250	
ctt tgg gca gaa gta gaa cat gac tat acc act tat ggc gaa gag ctc															818	
Leu	Trp	Ala	Glu	Val	Glu	His	Asp	Tyr	Thr	Thr	Tyr	Gly	Glu	Leu		
255															265	
aaa ttt ggc gcg ggt aaa act atc cgt gag ggc atg ggt cag agc aat															866	
Lys	Phe	Gly	Ala	Gly	Lys	Thr	Ile	Arg	Glu	Gly	Met	Gly	Gln	Ser	Asn	
270															285	
agt cca gat gaa aac acc cta gat tta gtc atc acc aac gcg atg att															914	

Ser Pro Asp Glu Asn Thr Leu Asp Leu Val Ile Thr Asn Ala Met Ile			
290	295	300	
att gac tac acc ggg att tac aaa gcc gac att ggc att aaa aat ggc			962
Ile Asp Tyr Thr Gly Ile Tyr Lys Ala Asp Ile Gly Ile Lys Asn Gly			
305	310	315	
aaa atc cat ggc att ggc aag gca gga aac aag gac atg caa gat ggc			1010
Lys Ile His Gly Ile Gly Lys Ala Gly Asn Lys Asp Met Gln Asp Gly			
320	325	330	
gta agc cct cat atg gtc gtg ggt gtg ggc aca gaa gca tta gca ggg			1058
Val Ser Pro His Met Val Val Gly Val Gly Thr Glu Ala Leu Ala Gly			
335	340	345	
gaa ggt atg att att acc gct ggg ggg atc gat tca cac acc cac ttc			1106
Glu Gly Met Ile Ile Thr Ala Gly Gly Ile Asp Ser His Thr His Phe			
350	355	360	365
ctc tct cca caa ttc cct acc gct cta gcc aat ggc gtt aca acc			1154
Leu Ser Pro Gln Gln Phe Pro Thr Ala Leu Ala Asn Gly Val Thr Thr			
370	375	380	
atg ttt ggc ggt ggc aca ggt ccg gta gat ggc acg aat gcg act acc			1202
Met Phe Gly Gly Thr Gly Pro Val Asp Gly Thr Asn Ala Thr Thr			
385	390	395	
atc act ccg ggc aaa tgg aac ttg cac cgc atg ttg cgc gca gct gaa			1250
Ile Thr Pro Gly Lys Trp Asn Leu His Arg Met Leu Arg Ala Ala Glu			
400	405	410	
gag tat tct atg aat gtg ggc ttt ttg ggc aaa ggc aat agc tcc agt			1298
Glu Tyr Ser Met Asn Val Gly Phe Leu Gly Lys Gly Asn Ser Ser Ser			
415	420	425	
aaa aaa caa ctt gta gaa caa atg caa gcg ggc gcg atc ggc ttt aaa			1346
Lys Lys Gln Leu Val Glu Gln Met Gln Ala Gly Ala Ile Gly Phe Lys			
430	435	440	445
ttg cat gaa gac tgg ggc aca act cca agt gca atc gat cac tgc ttg			1394
Leu His Glu Asp Trp Gly Thr Pro Ser Ala Ile Asp His Cys Leu			
450	455	460	
agc gta gca gat gaa tac gat gtg caa gtt tgt atc cac acc gat acg			1442
Ser Val Ala Asp Glu Tyr Asp Val Gln Val Cys Ile His Thr Asp Thr			
465	470	475	
gtc aat gag gca ggt tat gta gat gac acc ctg aat gcg atg aac ggg			1490

Val	Asn	Glu	Ala	Gly	Tyr	Val	Asp	Asp	Thr	Leu	Asn	Ala	Met	Asn	Gly		
480						485					490						
cgc gcc atc cat gcc tac cac att gag gga gcg ggc gga gga cac tca															1538		
Arg	Ala	Ile	His	Ala	Tyr	His	Ile	Glu	Gly	Ala	Gly	Gly	Gly	His	Ser		
495						500				505							
cct gat gtt atc acc atg gca ggc gag ctc aat att cta ccc tcc tcc															1586		
Pro	Asp	Val	Ile	Thr	Met	Ala	Gly	Glu	Leu	Asn	Ile	Leu	Pro	Ser	Ser		
510						515				520			525				
aca acc ccc act atc ccc tat acc att aat acg gtt gca gaa cac tta															1634		
Thr	Thr	Pro	Thr	Ile	Pro	Tyr	Thr	Ile	Asn	Thr	Val	Ala	Glu	His	Leu		
530						535				540							
gac atg ctc atg acc tgc cac cac cta gat aaa cgc atc cgc gag gat															1682		
Asp	Met	Leu	Met	Thr	Cys	His	His	Leu	Asp	Lys	Arg	Ile	Arg	Glu	Asp		
545						550				555							
tta caa ttt tcc caa agc cgt atc cgc ccc ggc tct atc gcc gct gaa															1730		
Leu	Gln	Phe	Ser	Gln	Ser	Arg	Ile	Arg	Pro	Gly	Ser	Ile	Ala	Ala	Glu		
560						565				570							
gat gtg ctc cat gat att ggc gtg atc gcg atg aca agc tcg gat tcg															1778		
Asp	Val	Leu	His	Asp	Ile	Gly	Val	Ile	Ala	Met	Thr	Ser	Ser	Asp	Ser		
575						580				585							
caa gca atg ggg cgc gct ggc gaa gtg att cct cga act tgg cag act															1826		
Gln	Ala	Met	Gly	Arg	Ala	Gly	Glu	Val	Ile	Pro	Arg	Thr	Trp	Gln	Thr		
590						595				600			605				
gcg gat aag aat aaa gaa ttt ggt aag ctt cct gaa gat agt gca															1874		
Ala	Asp	Lys	Asn	Lys	Lys	Glu	Phe	Gly	Lys	Leu	Pro	Glu	Asp	Ser	Ala		
610						615				620							
gat aac gac aac ttc cgt atc aaa cgc tac atc tcc aaa tac act att															1922		
Asp	Asn	Asp	Asn	Phe	Arg	Ile	Lys	Arg	Tyr	Ile	Ser	Lys	Tyr	Thr	Ile		
625						630				635							
aac ccc gct cta acc cat ggg gta agc gag tat atc ggc tct gtg gaa															1970		
Asn	Pro	Ala	Leu	Thr	His	Gly	Val	Ser	Glu	Tyr	Ile	Gly	Ser	Val	Glu		
640						645				650							
gag ggc aaa atc gct gat ttg gtg gtg tgg aat cct gcc ttt ttt ggt															2018		
Glu	Gly	Lys	Ile	Ala	Asp	Leu	Val	Val	Trp	Asn	Pro	Ala	Phe	Phe	Gly		
655						660				665							
gtg aaa cct aag att gtg atc aaa ggc ggt atg gtg gtc ttc tct gaa															2066		

Val Lys Pro Lys Ile Val Ile Lys Gly Gly Met Val Val Phe Ser Glu			
670	675	680	685
atg ggc gac tcc aac gcg tcc gtg cct aca cct cag ccg gtt tat tac			2114
Met Gly Asp Ser Asn Ala Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr			
690	695	700	
cgc gaa atg ttt ggg cat cac ggc aag gcg aaa ttt gac acc agc atc			2162
Arg Glu Met Phe Gly His His Gly Lys Ala Lys Phe Asp Thr Ser Ile			
705	710	715	
act ttt gtt tcc aaa gtc gac tat gaa aat ggc gtg aaa gaa aaa cta			2210
Thr Phe Val Ser Lys Val Ala Tyr Glu Asn Gly Val Lys Glu Lys Leu			
720	725	730	
ggc tta gag cgc aag gtg cta ccc gtg aaa aac tgc cgc aac atc act			2258
Gly Leu Glu Arg Lys Val Leu Pro Val Lys Asn Cys Arg Asn Ile Thr			
735	740	745	
aag aaa gac ttc aaa ttc aac aac aag acg gcg cat atc act gtc gat			2306
Lys Lys Asp Phe Lys Phe Asn Asn Lys Thr Ala His Ile Thr Val Asp			
750	755	760	765
cct aaa acc ttc gag gtc ttt gta gat ggc aaa ctc tgc acc tct aaa			2354
Pro Lys Thr Phe Glu Val Phe Val Asp Gly Lys Leu Cys Thr Ser Lys			
770	775	780	
ccc gcc tct gaa gtg cct cta gcc cag cgc tac act ttc ttc tag			2399
Pro Ala Ser Glu Val Pro Leu Ala Gln Arg Tyr Thr Phe Phe			
785	790	795	
gcncaatg			2407

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<211> 226
<212> PRT
<213> Helicobacter felis

<400> 11
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Gly Glu Val Ala Arg Lys Arg Lys Ala Glu Gly Leu Lys Leu Asn Gln
20 25 30
Pro Glu Ala Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala Arg
35 40 45
Arg Gly Lys Lys Thr Val Ala Glu Leu Met Glu Glu Cys Met His Phe
50 55 60

Leu Lys Lys Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro Asp
 65 70 75 80
 Leu Gly Val Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr Val
 85 90 95
 Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys
 100 105 110
 Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Ala Gly Lys Glu Val Thr
 115 120 125
 Glu Leu Glu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser
 130 135 140
 His Phe His Phe Phe Glu Ala Asn Lys Ala Leu Lys Phe Asp Arg Glu
 145 150 155 160
 Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg
 165 170 175
 Ile Gly Ala Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly Gly
 180 185 190
 Ser Lys Lys Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala Asp
 195 200 205
 Glu Arg His Lys His Lys Ala Leu Glu Lys Ala Lys Ser His Gly Phe
 210 215 220
 Ile Lys
 225

<210> 12
 <211> 568
 <212> PRT
 <213> Helicobacter felis

<400> 12

Met Lys Met Lys Lys Gln Glu Tyr Val Asn Thr Tyr Gly Pro Thr Thr
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 Gly Asp Lys Val Arg Leu Gly Asp Thr Asp Leu Trp Ala Glu Val Glu
 20 25 30
 His Asp Tyr Thr Thr Tyr Gly Glu Glu Leu Lys Phe Gly Ala Gly Lys
 35 40 45
 Thr Ile Arg Glu Gly Met Gly Gln Ser Asn Ser Pro Asp Glu Asn Thr
 50 55 60
 Leu Asp Leu Val Ile Thr Asn Ala Met Ile Ile Asp Tyr Thr Gly Ile
 65 70 75 80
 Tyr Lys Ala Asp Ile Gly Ile Lys Asn Gly Lys Ile His Gly Ile Gly
 85 90 95
 Lys Ala Gly Asn Lys Asp Met Gln Asp Gly Val Ser Pro His Met Val
 100 105 110
 Val Gly Val Gly Thr Glu Ala Leu Ala Gly Glu Gly Met Ile Ile Thr
 115 120 125
 Ala Gly Gly Ile Asp Ser His Thr His Phe Leu Ser Pro Gln Gln Phe
 130 135 140

Pro Thr Ala Leu Ala Asn Gly Val Thr Thr Met Phe Gly Gly Gly Thr
 145 150 155 160
 Gly Pro Val Asp Gly Thr Asn Ala Thr Thr Ile Thr Pro Gly Lys Trp
 165 170 175
 Asn Leu His Arg Met Leu Arg Ala Ala Glu Glu Tyr Ser Met Asn Val
 180 185 190
 Gly Phe Leu Gly Lys Gly Asn Ser Ser Ser Lys Lys Gln Leu Val Glu
 195 200 205
 Gln Met Gln Ala Gly Ala Ile Gly Phe Lys Leu His Glu Asp Trp Gly
 210 215 220
 Thr Thr Pro Ser Ala Ile Asp His Cys Leu Ser Val Ala Asp Glu Tyr
 225 230 235 240
 Asp Val Gln Val Cys Ile His Thr Asp Thr Val Asn Glu Ala Gly Tyr
 245 250 255
 Val Asp Asp Thr Leu Asn Ala Met Asn Gly Arg Ala Ile His Ala Tyr
 260 265 270
 His Ile Glu Gly Ala Gly Gly His Ser Pro Asp Val Ile Thr Met
 275 280 285
 Ala Gly Glu Leu Asn Ile Leu Pro Ser Ser Thr Thr Pro Thr Ile Pro
 290 295 300
 Tyr Thr Ile Asn Thr Val Ala Glu His Leu Asp Met Leu Met Thr Cys
 305 310 315 320
 His His Leu Asp Lys Arg Ile Arg Glu Asp Leu Gln Phe Ser Gln Ser
 325 330 335
 Arg Ile Arg Pro Gly Ser Ile Ala Ala Glu Asp Val Leu His Asp Ile
 340 345 350
 Gly Val Ile Ala Met Thr Ser Ser Asp Ser Gln Ala Met Gly Arg Ala
 355 360 365
 Gly Glu Val Ile Pro Arg Thr Trp Gln Thr Ala Asp Lys Asn Lys Lys
 370 375 380
 Glu Phe Gly Lys Leu Pro Glu Asp Ser Ala Asp Asn Asn Phe Arg
 385 390 395 400
 Ile Lys Arg Tyr Ile Ser Lys Tyr Thr Ile Asn Pro Ala Leu Thr His
 405 410 415
 Gly Val Ser Glu Tyr Ile Gly Ser Val Glu Glu Gly Lys Ile Ala Asp
 420 425 430
 Leu Val Val Trp Asn Pro Ala Phe Phe Gly Val Lys Pro Lys Ile Val
 435 440 445
 Ile Lys Gly Gly Met Val Val Phe Ser Glu Met Gly Asp Ser Asn Ala
 450 455 460
 Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr Arg Glu Met Phe Gly His
 465 470 475 480
 His Gly Lys Ala Lys Phe Asp Thr Ser Ile Thr Phe Val Ser Lys Val
 485 490 495
 Ala Tyr Glu Asn Gly Val Lys Glu Lys Leu Gly Leu Glu Arg Lys Val
 500 505 510
 Leu Pro Val Lys Asn Cys Arg Asn Ile Thr Lys Lys Asp Phe Lys Phe
 515 520 525

Asn Asn Lys Thr Ala His Ile Thr Val Asp Pro Lys Thr Phe Glu Val
 530 535 540
 Phe Val Asp Gly Lys Leu Cys Thr Ser Lys Pro Ala Ser Glu Val Pro
 545 550 555 560
 Leu Ala Gln Arg Tyr Thr Phe Phe
 565

<210> 13
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 <212> DNA
 <213> *Helicobacter felis*

<220>
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 <222> (48)...(728)

<220>
 <221> CDS
 <222> (739)...(2445)

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 aggactataa tccccattgcc tttaaaaattt aacacaagga gtaataag gtg aaa ctc 56
 Val Lys Leu
 1

aca ccc aaa gag caa gaa aag ttc ttg tta tat tat gcg ggc gaa gtg 104
 Thr Pro Lys Glu Gln Glu Lys Phe Leu Leu Tyr Tyr Ala Gly Glu Val
 5 10 15

gct aga aag cgc aaa gca gag ggc tta aag ctc aac caa ccc gaa gcc 152
 Ala Arg Lys Arg Lys Ala Glu Gly Leu Lys Leu Asn Gln Pro Glu Ala
 20 25 30 35

att gcc tac att agt gcc cat att atg gac gag gcg cgt cgt ggc aaa 200
 Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala Arg Arg Gly Lys
 40 45 50

aaa acc gtt gcg gaa ctt atg gaa gag tgt atg cac ttt ttg aaa aaa 248
 Lys Thr Val Ala Glu Leu Met Glu Glu Cys Met His Phe Leu Lys Lys
 55 60 65

gac gag gtg atg ccc ggg gtg ggg aat atg gtc cct gat ttg ggc gtg 296
 Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro Asp Leu Gly Val
 70 75 80

gaa gcc act ttc ccc gat ggc acc aaa ctc gta act gtg aat tgg ccc 344

Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr Val Asn Trp Pro			
85	90	95	
atc gaa cct gat gaa cac ttt aag gcg ggt gaa gtg aaa ttt ggc tgt			392
Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys Phe Gly Cys			
100	105	110	115
gat aaa gac att gaa ctc aac gca ggt aag gaa gtt acc gaa cta gaa			440
Asp Lys Asp Ile Glu Leu Asn Ala Gly Lys Glu Val Thr Glu Leu Glu			
120	125	130	
gtt act aac gaa gga cct aaa tcc ttg cat gtg ggt agc cat ttc cac			488
Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser His Phe His			
135	140	145	
ttc ttt gaa gcc aac aaa gca ttg aaa ttc gat cgg gaa aaa gcc tat			536
Phe Phe Glu Ala Asn Lys Ala Leu Lys Phe Asp Arg Glu Lys Ala Tyr			
150	155	160	
ggc aaa cgc cta gat att ccc tct ggc aac aca cta cgc att ggg gca			584
Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg Ile Gly Ala			
165	170	175	
gga caa acc cgt aaa gtg cag tta atc cct ctt ggc ggt agt aaa aaa			632
Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly Gly Ser Lys Lys			
180	185	190	195
gtg att ggc atg aac ggg ctt gtg aat aat att gcg gac gaa cgc cat			680
Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala Asp Glu Arg His			
200	205	210	
aaa cac aaa gcg cta gac aaa gca aaa tct cac gga ttt atc aag taa			728
Lys His Lys Ala Leu Asp Lys Ala Lys Ser His Gly Phe Ile Lys			
215	220	225	
ggagactccc atg aaa atg aaa aaa caa gag tat gta aat acc tac gga			777
Met Lys Met Lys Gln Glu Tyr Val Asn Thr Tyr Gly			
230	235	240	
ccc acc aca ggc gat aaa gtg cgc tta gga gat acc gat ctt tgg gca			825
Pro Thr Thr Gly Asp Lys Val Arg Leu Gly Asp Thr Asp Leu Trp Ala			
245	250	255	
gaa gta gaa cat gac tat acc acc tat ggc gaa gaa ctc aaa ttc ggt			873
Glu Val Glu His Asp Tyr Thr Tyr Gly Glu Glu Leu Lys Phe Gly			
260	265	270	
gca ggt aaa act atc cgt gag ggt atg ggt cag agc aat agc cca gat			921

Ala	Gly	Lys	Thr	Ile	Arg	Glu	Gly	Met	Gly	Gln	Ser	Asn	Ser	Pro	Asp	
275						280					285					
gaa aac acc tta gat tta gtg atc acc aac gcg atg att att gac tac															969	
Glu	Asn	Thr	Leu	Asp	Leu	Val	Ile	Thr	Asn	Ala	Met	Ile	Ile	Asp	Tyr	
290						295					300					
acc ggg att tac aaa gcc gac att ggc att aaa aat ggc aaa atc cat															1017	
Thr	Gly	Ile	Tyr	Lys	Ala	Asp	Ile	Gly	Ile	Lys	Asn	Gly	Lys	Ile	His	
305						310					315				320	
ggc att ggc aag gca gga aac aag gac atg caa gat ggc gta agc cct															1065	
Gly	Ile	Gly	Lys	Ala	Gly	Asn	Lys	Asp	Met	Gln	Asp	Gly	Val	Ser	Pro	
325						330					335					
cat atg gtc gtg ggt gtg ggc aca gaa gca cta gca ggg gaa ggt atg															1113	
His	Met	Val	Val	Gly	Val	Gly	Thr	Glu	Ala	Leu	Ala	Gly	Glu	Gly	Met	
340						345					350					
att att acc gct ggg ggg atc gat tca cac acc cac ttc ctc tct cca															1161	
Ile	Ile	Thr	Ala	Gly	Ile	Asp	Ser	His	Thr	His	Phe	Leu	Ser	Pro		
355						360					365					
caa caa ttc cct acc gct cta gcc aat ggc gtt aca aca atg ttt ggc															1209	
Gln	Gln	Phe	Pro	Thr	Ala	Leu	Ala	Asn	Gly	Val	Thr	Thr	Met	Phe	Gly	
370						375					380					
ggc aca ggc ccc gta gat ggc acg aat gcg act acc atc act ccg															1257	
Gly	Gly	Thr	Gly	Pro	Val	Asp	Gly	Thr	Asn	Ala	Thr	Thr	Ile	Thr	Pro	
385						390					395				400	
ggc aaa tgg aac ttg cac cgc atg ttg cgc gca gca gaa gag tat tct															1305	
Gly	Lys	Trp	Asn	Leu	His	Arg	Met	Leu	Arg	Ala	Ala	Glu	Glu	Tyr	Ser	
405						410					415					
atg aat gtg ggc ttt ttg ggc aaa ggc aat agc tct agt aaa aaa caa															1353	
Met	Asn	Val	Gly	Phe	Leu	Gly	Lys	Gly	Asn	Ser	Ser	Ser	Lys	Lys	Gln	
420						425					430					
ctt gta gaa caa gta gaa gcg ggc gcg att ggt ttt aaa ttg cat gaa															1401	
Leu	Val	Glu	Gln	Val	Glu	Ala	Gly	Ala	Ile	Gly	Phe	Lys	Leu	His	Glu	
435						440					445					
gac tgg ggc aca act cca agt gcg atc gat cac tgc ttg agc gta gca															1449	
Asp	Trp	Gly	Thr	Thr	Pro	Ser	Ala	Ile	Asp	His	Cys	Leu	Ser	Val	Ala	
450						455					460					
gat gaa tac gat gtg caa gtt tgt ata cac acc gat acg gtc aat gag															1497	

Asp Glu Tyr Asp Val Gln Val Cys Ile His Thr Asp Thr Val Asn Glu			
465	470	475	480
gca ggt tat gta gat gac acc cta aat gca atg aac ggg cgc gcc atc			1545
Ala Gly Tyr Val Asp Asp Thr Leu Asn Ala Met Asn Gly Arg Ala Ile			
485	490	495	
cat gcc tac cac att gag gga gcg ggt gga gga cac tca cct gat gtt			1593
His Ala Tyr His Ile Glu Gly Ala Gly Gly His Ser Pro Asp Val			
500	505	510	
atc acc atg gca ggc gaa gtg aat att cta ccc tcc tcc aca acc cct			1641
Ile Thr Met Ala Gly Glu Val Asn Ile Leu Pro Ser Ser Thr Thr Pro			
515	520	525	
act atc ccc tat acc att aat acg gtt gca gaa cac tta gac atg ctt			1689
Thr Ile Pro Tyr Thr Ile Asn Thr Val Ala Glu His Leu Asp Met Leu			
530	535	540	
atg acc tgc cac cac cta gat aaa cgc atc cgc gag gat ctc caa ttt			1737
Met Thr Cys His His Leu Asp Lys Arg Ile Arg Glu Asp Leu Gln Phe			
545	550	555	560
tct caa agc cgt atc cgc ccc ggc tct atc gcc gct gaa gat gtg ctc			1785
Ser Gln Ser Arg Ile Arg Pro Gly Ser Ile Ala Ala Glu Asp Val Leu			
565	570	575	
cat gat atc ggt gtg atc gcg atg aca agt tcc gat tcg caa gca atg			1833
His Asp Ile Gly Val Ile Ala Met Thr Ser Ser Asp Ser Gln Ala Met			
580	585	590	
ggg cgc gct ggg gaa gtg att cct aga act tgg caa act gca gac aag			1881
Gly Arg Ala Gly Glu Val Ile Pro Arg Thr Trp Gln Thr Ala Asp Lys			
595	600	605	
aat aaa aaa gaa ttt ggt aag ctt cct gaa gat ggt gca gat aat gac			1929
Asn Lys Lys Glu Phe Gly Lys Leu Pro Glu Asp Gly Ala Asp Asn Asp			
610	615	620	
aac ttc cgc atc aaa cgc tat atc tcc aaa tac acc att aat ccc gct			1977
Asn Phe Arg Ile Lys Arg Tyr Ile Ser Lys Tyr Thr Ile Asn Pro Ala			
625	630	635	640
ttg acc cat ggc gtg agc gag tat atc ggc tct gtg gaa gag ggc aag			2025
Leu Thr His Gly Val Ser Glu Tyr Ile Gly Ser Val Glu Glu Gly Lys			
645	650	655	
atc gcc gac ttg gtg tgg aat cct gcc ttt ttt ggc gta aaa ccc			2073

Ile Ala Asp Leu Val Val Trp Asn Pro Ala Phe Phe Gly Val Lys Pro			
660	665	670	
aaa atc gtg atc aaa ggc ggt atg gtg gtg ttc tct gaa atg ggc gat			2121
Lys Ile Val Ile Lys Gly Gly Met Val Val Phe Ser Glu Met Gly Asp			
675	680	685	
tct aat gcg tct gtg ccc act cct cag ccg gtt tat tac cgc gaa atg			2169
Ser Asn Ala Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr Arg Glu Met			
690	695	700	
ttt ggg cat cac ggc aag gcg aaa ttt gac acc agc atc act ttt gtt			2217
Phe Gly His His Gly Lys Ala Lys Phe Asp Thr Ser Ile Thr Phe Val			
705	710	715	720
tcc aaa gtc gcc tat gaa aat ggt gtg aaa gaa aaa cta ggt tta gag			2265
Ser Lys Val Ala Tyr Glu Asn Gly Val Lys Glu Lys Leu Gly Leu Glu			
725	730	735	
cgc aag gtg ctc ccc gtg aaa aac tgc cgt aac atc acc aag aag gac			2313
Arg Lys Val Leu Pro Val Lys Asn Cys Arg Asn Ile Thr Lys Lys Asp			
740	745	750	
ttc aag ttc aac gac aaa act gca aaa atc acc gtc gat ccg aaa acc			2361
Phe Lys Phe Asn Asp Lys Thr Ala Lys Ile Thr Val Asp Pro Lys Thr			
755	760	765	
ttc gag gtc ttt gta gat ggc aaa ctc tgc acc tct aaa ccc acc tct			2409
Phe Glu Val Phe Val Asp Gly Lys Leu Cys Thr Ser Lys Pro Thr Ser			
770	775	780	
gaa gtg cct cta gcc caa cgc tac act ttc ttc tag gcataat			2452
Glu Val Pro Leu Ala Gln Arg Tyr Thr Phe Phe			
785	790	795	
<210> 14			
<211> 226			
<212> PRT			
<213> Helicobacter felis			
<400> 14			
Val Lys Leu Thr Pro Lys Glu Gln Glu Lys Phe Leu Leu Tyr Tyr Ala			
1	5	10	15
Gly Glu Val Ala Arg Lys Arg Lys Ala Glu Gly Leu Lys Leu Asn Gln			
20	25	30	
Pro Glu Ala Ile Ala Tyr Ile Ser Ala His Ile Met Asp Glu Ala Arg			
35	40	45	

Arg Gly Lys Lys Thr Val Ala Glu Leu Met Glu Glu Cys Met His Phe
 50 55 60
 Leu Lys Lys Asp Glu Val Met Pro Gly Val Gly Asn Met Val Pro Asp
 65 70 75 80
 Leu Gly Val Glu Ala Thr Phe Pro Asp Gly Thr Lys Leu Val Thr Val
 85 90 95
 Asn Trp Pro Ile Glu Pro Asp Glu His Phe Lys Ala Gly Glu Val Lys
 100 105 110
 Phe Gly Cys Asp Lys Asp Ile Glu Leu Asn Ala Gly Lys Glu Val Thr
 115 120 125
 Glu Leu Glu Val Thr Asn Glu Gly Pro Lys Ser Leu His Val Gly Ser
 130 135 140
 His Phe His Phe Phe Glu Ala Asn Lys Ala Leu Lys Phe Asp Arg Glu
 145 150 155 160
 Lys Ala Tyr Gly Lys Arg Leu Asp Ile Pro Ser Gly Asn Thr Leu Arg
 165 170 175
 Ile Gly Ala Gly Gln Thr Arg Lys Val Gln Leu Ile Pro Leu Gly Gly
 180 185 190
 Ser Lys Lys Val Ile Gly Met Asn Gly Leu Val Asn Asn Ile Ala Asp
 195 200 205
 Glu Arg His Lys His Lys Ala Leu Asp Lys Ala Lys Ser His Gly Phe
 210 215 220
 Ile Lys
 225

<210> 15
 <211> 568
 <212> PRT
 <213> Helicobacter felis

<400> 15
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 Gly Asp Lys Val Arg Leu Gly Asp Thr Asp Leu Trp Ala Glu Val Glu
 20 25 30
 His Asp Tyr Thr Tyr Gly Glu Glu Leu Lys Phe Gly Ala Gly Lys
 35 40 45
 Thr Ile Arg Glu Gly Met Gly Gln Ser Asn Ser Pro Asp Glu Asn Thr
 50 55 60
 Leu Asp Leu Val Ile Thr Asn Ala Met Ile Ile Asp Tyr Thr Gly Ile
 65 70 75 80
 Tyr Lys Ala Asp Ile Gly Ile Lys Asn Gly Lys Ile His Gly Ile Gly
 85 90 95
 Lys Ala Gly Asn Lys Asp Met Gln Asp Gly Val Ser Pro His Met Val
 100 105 110
 Val Gly Val Gly Thr Glu Ala Leu Ala Gly Glu Gly Met Ile Ile Thr
 115 120 125

Ala Gly Gly Ile Asp Ser His Thr His Phe Leu Ser Pro Gln Gln Phe
 130 135 140
 Pro Thr Ala Leu Ala Asn Gly Val Thr Thr Met Phe Gly Gly Thr
 145 150 155 160
 Gly Pro Val Asp Gly Thr Asn Ala Thr Thr Ile Thr Pro Gly Lys Trp
 165 170 175
 Asn Leu His Arg Met Leu Arg Ala Ala Glu Glu Tyr Ser Met Asn Val
 180 185 190
 Gly Phe Leu Gly Lys Gly Asn Ser Ser Ser Lys Lys Gln Leu Val Glu
 195 200 205
 Gln Val Glu Ala Gly Ala Ile Gly Phe Lys Leu His Glu Asp Trp Gly
 210 215 220
 Thr Thr Pro Ser Ala Ile Asp His Cys Leu Ser Val Ala Asp Glu Tyr
 225 230 235 240
 Asp Val Gln Val Cys Ile His Thr Asp Thr Val Asn Glu Ala Gly Tyr
 245 250 255
 Val Asp Asp Thr Leu Asn Ala Met Asn Gly Arg Ala Ile His Ala Tyr
 260 265 270
 His Ile Glu Gly Ala Gly Gly His Ser Pro Asp Val Ile Thr Met
 275 280 285
 Ala Gly Glu Val Asn Ile Leu Pro Ser Ser Thr Thr Pro Thr Ile Pro
 290 295 300
 Tyr Thr Ile Asn Thr Val Ala Glu His Leu Asp Met Leu Met Thr Cys
 305 310 315 320
 His His Leu Asp Lys Arg Ile Arg Glu Asp Leu Gln Phe Ser Gln Ser
 325 330 335
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 Gly Glu Val Ile Pro Arg Thr Trp Gln Thr Ala Asp Lys Asn Lys Lys
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 Glu Phe Gly Lys Leu Pro Glu Asp Gly Ala Asp Asn Asp Asn Phe Arg
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 Gly Val Ser Glu Tyr Ile Gly Ser Val Glu Glu Gly Lys Ile Ala Asp
 420 425 430
 Leu Val Val Trp Asn Pro Ala Phe Phe Gly Val Lys Pro Lys Ile Val
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 Ile Lys Gly Gly Met Val Val Phe Ser Glu Met Gly Asp Ser Asn Ala
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 Ser Val Pro Thr Pro Gln Pro Val Tyr Tyr Arg Glu Met Phe Gly His
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 His Gly Lys Ala Lys Phe Asp Thr Ser Ile Thr Phe Val Ser Lys Val
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 Ala Tyr Glu Asn Gly Val Lys Glu Lys Leu Gly Leu Glu Arg Lys Val
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